

Henosepilachna vigintioctopunctata (Coleoptera: Coccinellidae: Epilachninae) attacking cultivated and wild crops in Brazil

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Authors' contributions

This work was carried out in collaboration among all authors managed the literature searches and did a critical review and read and approved the final manuscript. Author RLA and Author GMF and AMH designed the study and Author CHBA and Author PMM and Author TPC conducted experiments.

ABSTRACT

Henosepilachna vigintioctopunctata was recorded on *Solanum melongena* L. for the first time in cultivated crops areas in Espírito Santo State, southeastern Brazil, in the first semester of 2017. In one-year research, *H. vigintioctopunctata* was recorded in eight host plants of the families *Amaranthaceae* and *Solanaceae*. These new records represent a high potential establishment of this pest in Brazil.

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Key words: 28-spotted lady bird beetle, Hadda beetle, Solanaceae, *Solanum melongena*.

1. INTRODUCTION

Henosepilachna vigintioctopunctata (Fabricius, 1775) (Coleoptera: Coccinellidae: Epilachninae), the 28-spotted lady bird beetle or Hadda beetle has been reported as one of the most important pest of cultivated and wild Solanaceae and Cucurbitaceae plants in Asia, with records as pest in China [1], India [2-4], Indonesia [5,6], Japan [7,8] and Pakistan [9] and in Oceania, with records in Australia [10]. Cultivated plants in these regions include eggplants, potatoes, tomatoes, tobacco and cucumbers.

In Western Hemisphere, the first record of *H. vigintioctopunctata* was made in 1990 in Curitiba, Paraná State, Brazil, in an unidentified wild cucurbit. In 1991, it was detected in Paranaguá, on *Piper nigrum* L. (Piperaceae) and in 1992 in Itajaí, Santa Catarina State, on *Solanum americanum* Mill. (Solanaceae) [11]. On the three mentioned records, only adults were reported. *Henosepilachna vigintioctopunctata* was probably introduced from Port of Paranaguá, Paraná State (L.M. Almeida, personal communication).

In 2002, adults and larvae were over again collected in *S. americanum* in Itajaí. In 2010, all development stages of *H. vigintioctopunctata* were collected on *Brugmansis suaveoleus* (Humb. and Bonpl. ex Willd.) (Solanaceae) in Campinas and São Paulo, São Paulo State [12].

During field researches at Instituto Federal do Espírito Santo, Campus Itapina, in Colatina, Espírito Santo State, in the first semester of 2017, adults and larvae were observed attacking eggplants *Solanum melongena* L. (Solanaceae). New records were made through one year in different host plants.

48 Adults and larvae collected in July 2018, in Colatina, in eggplants were sent to Dra. Lucia Massutti
 49 Almeida, Department of Zoology, Federal University of Paraná (UFPR), Curitiba, Brazil, to species
 50 identification. Vouchers specimens were deposited in Entomology Collection Prof. Dr. Pe. Jesus
 51 Santiago Moure, UFPR.

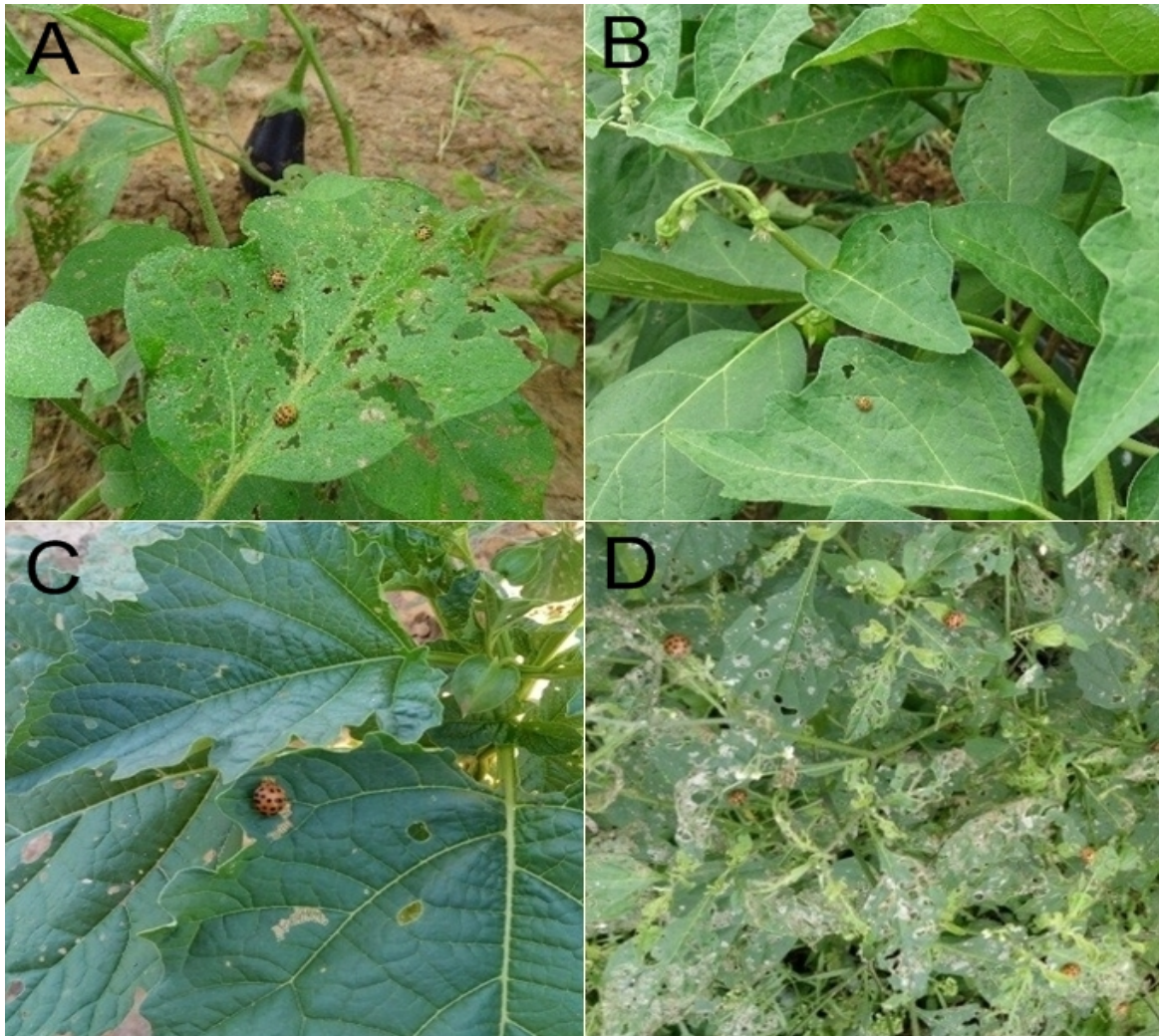
52 In one-year surveys through visual observation of the presence or absent of *H.*
 53 *vigintioctopunctata* in different cultures present in Espírito Santo State, eggs, larva and adults were
 54 observed in eight plants, host of the Amaranthaceae and Solanaceae, five of them with all development
 55 stages of of the pest. The larva stage is the phase responsible for the greatest damage to crops (Table
 56 1).

57
 58 **Table 1. Host plants and development stages of *Henosepilachna vigintioctopunctata* found in**
 59 **Espirito Santo, Brazil, July 2017-Agost 2018.**

Botanical family	Host plant	Development stage found			
		Egg	*Larva	Pupa	Adult
Amaranthaceae	<i>Amaranthus viridis</i> L.	A	A	A	P
Solanaceae	<i>Brugmansia suaveolens</i> (Willd.)	P	P	P	P
	<i>Physalis angulata</i> L.	P	P	P	P
	<i>Solanum aethiopicum</i> L.	P	P	P	P
	<i>Solanum lycopersicum</i> L.	A	A	A	P
	<i>Solanum melongena</i> L.	P	P	P	P
	<i>Solanum nigrum</i> L.	P	P	P	P
	<i>Solanum paniculatum</i> L.	A	A	A	P

60 P – present, A – absent.*Phase that causes more damage to crops.

61
 62 Attacked leaves showed typical symptoms mentioned to *H. vigintioctopunctata*, characterized by
 63 a network aspect due to scraped occasioned by larval and adults (Fig. 1.). According to Mohanchander *et*
 64 *al.*, in *S. melongena* leaves, larvae feed on phloem, epidermal and parenchymal tissues, while adults
 65 scraped upper and lower sides of the leaves [13]. In India, the production of eggplant fruits to field was
 66 reduced up 60% [14].



67

68 **Fig. 1. Attacked plants by *Henosepilachna vigintioctopunctata*: *Solanum melongena* L. (A),**
 69 ***Solanum aethiopicum* L. (B), *Physalis angulata* L. (C) and *Solanum nigrum* L. (D) in Espirito Santo,**
 70 **Brazil, July 2017-August 2018.**

71

72 **2. Conclusion**

73 In 2016, the Brazilian Association of Seed and Seed Trade (ABCSEM) estimated 820 thousand
 74 hectares of vegetable crop, among which are the Amaranthaceae and Solanaceae. From the first record
 75 of *H. vigintioctopunctata* to the present study, they are 1000 km away from their first occurrence in Brazil.
 76 The new records are in agriculture areas and in eight hosts that represents a high potential of
 77 establishment of this pest in Brazil. *H. vigintioctopunctata* has not been mentioned in the list of quarantine
 78 pests of the Ministry of Agriculture, so efforts should be made to avoid the spread of *H.*
 79 *vigintioctopunctata* due to the high potential for losses that this pest can cause the production of
 80 vegetables throughout the national territory.

81

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86 **COMPETING INTERESTS DISCLAIMER:**

87 **Authors have declared that no competing interests exist. The products used for this research are**
88 **commonly and predominantly use products in our area of research and country. There is**
89 **absolutely no conflict of interest between the authors and producers of the products because we**
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94 **References**

- 95 1. Zhou L, Xie BG, Wang XP. Population dynamic of *Henosepilachna vigintioctopunctata* in different host
96 plants in Jiangnan plain. China J North Hort. 2015; 11:103–105 (in Chinese).
- 97 2. Rajagopal D, Trivedi TP. Status bioecology and management of *Epilachna* beetle, *Epilachna*
98 *vigintioctopunctata* (Fabricius) (Coleoptera: Coccinellidae) on potato in India: A review. Trop. Pest
99 Management. 1989;35(4):410-413.
- 100 3. Bhagat KC, Munshi SK. Host preference of spotted leaf-eating beetle, *Henosepilachna*
101 *vigintioctopunctata* (Fabricius) on brinjal varieties. Pest Management and Economic Zoology. 2004;
102 12:77-81.
- 103 4. Jamwal VVS, Ahmad H, Sharma D. Host biology interactions of *Epilachna vigintioctopunctata*
104 (Fabricius). The Bioscan. 2013;8(2):513-517.
- 105 5. Nakamura K, Abbas I, Hasyim A. Population dynamics of the phytophagous lady beetle *Epilachna*
106 *vigintioctopunctata* in an eggplant field in Sumatra. Researches on Population Ecology.1988; 30:25-41.
- 107 6. Katakura H, Nakano S, Kahono S, Aabbas I, Nakamura N. Epilachnine Ladybird Beetles (Coleoptera:
108 Coccinellidae) of Sumatra and Java. Tropics. 2001; 10(3): 325-352.
- 109 7. Hirano K. Study on the movements of the 28-spotted lady-beetle *Henosepilachna*
110 *vigintioctopunctata* by the mark-recapture method. Applied Entomology and Zoology. 1985; 29:7–13 (in
111 Japanese).
- 112 8. Hirano K. Population Dynamics of a phytophagous Lady beetle, *Epilachna vigintioctopunctata*
113 (Fabricius) (Coleoptera: Coccinellidae), Living in Spatio-temporally Heterogeneous Habitats: II. Seasonal
114 Changes in Adult Movement and Spatial Distribution of the Population. Applied Entomology and
115 Zoology.1993; 28(2):131.
- 116 9. Naz F, Inayatullah M, Rafi MA, Ashfaq, Ali A. *Henosepilachna vigintioctopunctata* (Fabricius)
117 (Epilachninae: Coccinellidae) its taxonomy, distribution and host plants in Pakistan. Sarhad Journal of
118 Agriculture. 2012; 28(3):421-427.
- 119 10. Richards AM. The *Epilachna vigintioctopunctata* Complex (Coleoptera: Coccinellidae). International
120 Journal of Entomology. 1983; 25:11-41.
- 121 11. Schroder RFW, Athanas MM, Pavan C. *Epilachna vigintioctopunctata* (Coleoptera: Coccinellidae),
122 new record for Western Hemisphere, with a review of host plants. Entomological News.1993; 104(2):111-
123 112.
- 124 12. Casari SA, Teixeira EP. Immatures of *Epilachna chevrolat* (Coleoptera: Coccinellidae, Epilachninae).
125 Revista Brasileira de Entomologia. 2015; 59:113-120.
- 126 13. Mohanchander P, Reegan AD, Rahman MA, Raveen RS. Effect of Hadda beetle, *Epilachna*
127 *vigintioctopunctata* Fab. (Coleoptera: Coccinellidae) infestation on eggplant leaf (*Solanum melongena* L.)
128 and bio-control potential of essential oil formulations. Pakistan Journal of Biological Sciences.
129 2013;16:991-997.
- 130 14. Mall NP, Pandey RS, Singh SV, Singh SK. Seasonal incidence of insect pests and estimation of the
131 losses caused by shoot-and-fruit borer on brinjal. Indian Journal of Entomology.1992; 54(3):241-247.
- 132